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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,915	04/12/2004	Takaharu Yamano	300.1152	2431

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EXAMINER	
VU, HUNG K	
ART UNIT	**PAPER NUMBER**
2811	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,915	YAMANO ET AL.	
	Examiner	Art Unit	
	Hung Vu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1 A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on 11/02/06 has been entered. An action on the RCE follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al. (PN 6,713,856, of record) in view of Alcoe et al. (PN 6,703,704).

Tsai et al. discloses, as shown in Figures 2-3, a semiconductor package, wherein

the semiconductor package (10) is a stacked body formed by bonding two or more semiconductor devices (20&34,56&58) through an insulating layer (30,60);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device faces a non-device pattern surface of a semiconductor device stacked on the lower semiconductor device;

the semiconductor device positioned, in sequence, as a lowermost semiconductor device and further comprising a back surface protective film and a heat radiation layer of a material having a high heat transfer rate, on the none-device pattern surface of the lowermost semiconductor device,

the back surface protective film is bonded to a back surface of the stacked body.

Tsai et al. disclose the back surface protective film is an electrically conductive film. Tsai et al. does not disclose the back surface protective film is an epoxy resin film. However, Alcoe et al. discloses a back surface protective film (27) is an electrically conductive film or an epoxy resin film. Note Figures 1, 4, 7, 11, 13, 15, and Col. 4, lines 15-21 of Alcoe et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the back surface protective film of Tsai et al. being an epoxy resin film, such as taught by Alcoe et al. since an electrically conductive film and an epoxy resin film are commonly used as the adhesive film and they are interchangeable.

Note that the terms "obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete semiconductor packages" and "by bonding" are method recitation in a device claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the

prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 3, Tsai et al. and Alcoe et al. disclose the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term "before said semiconductor packages are diced" is method recitation in a device claimed.

Regarding claim 4, Tsai et al. and Alcoe et al. disclose the heat radiation layer is one of a thin film. Note that the term "formed by a thin film formation technology" is method recitation in a device claimed.

Regarding claim 5, Tsai et al. and Alcoe et al. disclose the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Tsai et al. and Alcoe et al. disclose the heat radiation layer also acts as a support.

Regarding claim 7, Tsai et al. and Alcoe et al. disclose the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Tsai et al. and Alcoe et al. disclose the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer on the device pattern surface thereof,

and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer. Note that the term "before said semiconductor package is dice" is method recitation in a device claimed.

3. Claims 1 and 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (PN 5,627,106, of record) in view of Alcoe et al. (PN 6,703,704).

Hsu discloses, as shown in Figure 12, a semiconductor package, wherein

the semiconductor package is a stacked body formed by bonding two or more semiconductor devices (40,10) through an insulating layer (30,50);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device faces a non-device pattern surface of a semiconductor device stacked on the lower semiconductor device.

Hsu does not disclose the semiconductor device (40) positioned, in sequence, as lowermost semiconductor device further comprises a back surface protective film and a heat radiation layer of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device, wherein the suck surface protective film is an epoxy resin film. However, Alcoe et al. discloses a semiconductor device comprises a back surface protective film (27) and a heat radiation layer (28) of a material having a high heat transfer rate, on the none-device pattern surface of the lowermost semiconductor device, wherein the back surface protective film is an epoxy resin film. Note Figures 1, 4, 7, 11, 13, 15, and Col. 4, lines 15-21 of Alcoe et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the semiconductor device of Hsu having a back surface protective film and a

heat radiation layer on the non-device pattern surface on the semiconductor device, such as taught by Alcoe et al. in order to reduce the heat build-up from the semiconductor device. Note that the term "obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete semiconductor packages" is method recitation in a device claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 3, Hsu and Alcoe et al. disclose the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term "before said semiconductor packages are diced" is method recitation in a device claimed.

Regarding claim 4, Hsu and Alcoe et al. disclose the heat radiation layer is one of a thin film. Note that the term "formed by a thin film formation technology" is method recitation in a device claimed.

Regarding claim 5, Hsu and Alcoe et al. disclose the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Hsu and Alcoe et al. disclose the heat radiation layer also acts as a support.

Regarding claim 7, Hsu and Alcoe et al. disclose the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Hsu and Alcoe et al. disclose the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer (27) on the device pattern surface thereof, and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer. Note that the term "before said semiconductor package is dice" is method recitation in a device claimed.

Regarding claim 9, Hsu and Alcoe et al. disclose the device patterns of the semiconductor devices stacked are electrically connected to one another through a rewiring layer and a substrate through-electrode (26,20,46) that formed in one semiconductor device. Note that the term "are simultaneously formed in one semiconductor device" is method recitation in a device claimed.

Regarding claim 10, Hsu and Alcoe et al. disclose all of the claimed limitations except material of the re-wiring layer and the substrate through-electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the re-wiring layer and the substrate through-electrode of Hsu and Alcoe et al. having the materials as that claimed by Applicant, since it has been held to be within the general skill of a worker in the art to select a

known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Response to Arguments

4 Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Monday to Thursday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on (571) 272 - 1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vu

January 18, 2007

Hung Vu

Primary Examiner